

Applicant: Yao Wang, et al.
U.S.S.N.: 10/017,304
Filing Date: December 11, 2001
EMC Docket No.: EMC-01-201

REMARKS

Applicants thank the Examiner for the careful consideration of the subject application.

The Office Action of June 6, 20008 has been carefully considered. In this Office Action, Claims 1-5, 7, 8, 16-18, 20-22 and 24-28 are pending and stand rejected. Claims 6, 9-15 and 23 were previously cancelled. 1-5, 7, 8, 16-18, 20-22 and 24-28 were rejected under 35 USC 103. Based on the remarks made herein, Applicants respectfully request reconsideration, that the aforementioned rejections be withdrawn, and that the claims be placed in condition for allowance.

Rejection under 35 USC 103(a) Colby, Chiou, Martini

The Office Action rejected Claims 1-5, 7, 8, 16, 18, 20-22, 24-26 and 28 as being unpatentable over Colby (USP no. 6,449,647), hereinafter Colby, in view of Chiou (USP no. 6,792, 507), hereinafter Chiou, in further view of Martini (USP no. 5,737,533), hereinafter Martini. Applicants respectfully assert that the cited references, together or in isolation, may not be used as a proper 35 USC 103 rejection as they do not satisfy the KSR test as promulgated by the Supreme Court. Therefore, Applicants respectfully request that this rejection be withdrawn and these claims be placed in condition for allowance. Claims 1, 18, and 28 are the only independent and Claims 2-5, 7, 8, 16, 20-22, and 24-26 depend on these claims. Claims 18 and 28 are the system and program product version of the method of Claim 1 and, for the sake of brevity, these rejections will be argued together.

Applicants' arguments in brief are that none of the references teach or suggest the claimed feature of Claims 1, 18, and 28 that "said bandwidth allocation based on an estimate of the data to be copied, a number of invalid tracks between said first and second data storage systems..." Specifically, none of the references disclose "a number of invalid tracks between

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said first and second data storage systems.” Applicants assert that Colby, in general, discloses a method of determining a bandwidth based on data content and the required level of Quality of Service for the particular data content. Chiou states he discloses a “system and method . . . [which] includes a cache near the target devices and another cache at the requesting side so that the data traffic across the computer is reduced.” Martini states he discloses “allocating the bandwidth, the system assumes that all files are being transferred at the minimum rate and calculates n accordingly,” where the “minimum rate” refers to the “worst case when all accesses are made to the same bitstream and the bitstream is located at the inner tracks of the disk.” However, none of the references consider “a number of invalid tracks between said first and second data storage systems,” and hence Applicants would respectfully assert that these references may not be used for a proper 35 USC 103 rejection.

In *Teleflex v. KSR*, the Supreme Court stated that a proper 35 USC 103 rejection requires the following steps be performed: (1) Determining the scope and content of the prior art; (2) Ascertaining the differences between the claimed invention and the prior art; and (3) Resolving the level of ordinary skill in the pertinent art. *Teleflex Inc. v. KSR Int'l Co.* 127 S.Ct. 1727, 1741, 82 USPQ.2d 1385, 1396 (2007). This three part test has also been reemphasized and promulgated in the Federal Register. *Federal Register*, Vol. 72, No. 195.

With respect to the first prong of KSR, Applicants first address the scope of Colby. Colby, as characterized in Applicant's prior responses, discloses a method of determining bandwidth based on data content and the required level of Quality of Service for the particular data content. With respect to the second prong of KSR and Colby, Applicants assert that Colby does not disclose at least determining a bandwidth allocation based on the amount of data to be transferred, the time period in which to transfer the data and the conditions, i.e., number of

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invalid tracks, between the first and second storage systems, as is recited in the claims.

Applicants further note that the Office Action does not assert that Colby discloses this claimed feature.

With respect to the first prong of KSR and Chioe, Applicants address the scope of Chiou. Applicants assert that Chiou discloses a “cache system and method [that] includes a cache near the target devices and another cache at the requesting host side so that the data traffic across the network is reduced . . . [a] cache updating and invalidating method.” Chiou states that the

cache systems are implemented in a manner that allows the most efficient processing of read requests . . . [e]ach read request initiated would first be checked against the cached data in host-side cache system and be satisfied by that system if . . . present . . . If the host –side cache could not satisfy the read request, the read request is sent to the storage side-cache . . . [i]f a cache hit occurs at the storage-side cache system, the read request is satisfied by that system . . . [i]f both cache systems fail to generate a hit . . . then the request is forwarded to the target storage device.

As well, Chiou also discusses separate write requests with respect to the caches.

However, with respect to the second prong of KSR and Chiou, Applicants assert that Chiou does not cure the deficiencies of Colby. Applicants would respectfully assert that Chiou fails to provide any teaching regarding basing a bandwidth allocation based on conditions between the two storage systems, and more specifically does not disclose it based on “a number of invalid tracks between said first and second data storage systems.” Applicants also note that the Office Action does not assert that Chiou discloses this claimed feature.

Turning to the Martini reference, Applicants now address the first prong of KSR and Martini. Applicants assert that Martini discloses “store[ing] data in complementary blocks on

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multiple disks.” Martini states he teaches this so the “transfer rate is a combination of the maximum and minimum transfer rates of the pair of disks . . . [t]his constant data transfer rate may be higher than the minimum transfer rate of an individual disk.” Martini states that this allows “the file server . . . [to] allocate a higher bandwidth for data transfers and is capable of serving a larger number of users . . . system . . . [is] not limited in operation by the lowest transfer rate of the particular disk being used.” Column 4 lines 26-41.

Martini states that because of his method “the minimum transfer rate is increased. Column 6 line 24. As a result, Martini states at Column 6 line 24-35, that “NVFS may take into account a higher data transfer rate when allocating the bandwidth for data transfers . . . capable of delivering a larger number of data files . . . serving larger number of customers . . . no longer limited by the minimum transfer rate of an individual disk.” Hence, Applicants would respectfully assert that Marini discloses “allocating the bandwidth for data transfers” where the “transfer rate is a combination of the maximum and minimum transfer rates of the pair of disks.”

With respect to the second prong of KSR and Martini, Applicants assert that Martini does not cure the deficiencies of Colby or Chiou. Applicants would respectfully assert that Martini fails to disclose “an allocation of bandwidth for data copying from the first data storage system to the second data storage system over the network, said bandwidth allocation based on an estimate of the data to be copied, a number of invalid tracks between said first and second data storage systems, and a known time period in which to copy said data.” Applicants assert Colby does not consider “a number of invalid tracks between said first and second data storage systems” with respect to “allocation of bandwidth.” Rather, as noted above, Applicants assert that Martini allocates “bandwidth for data transfers” based on “the combination of maximum

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and minimum transfer rates of the pair of disks,” not on the “a number of invalid tracks between said first and second data storage systems.”

Applicants also respectfully assert that the portion of Martini cited in the Office Action, Column 3 line 57-Column 4 line 9, does not disclose the claimed feature of “a number of invalid tracks between said first and second data storage systems.” At the cited portion of Martini, Martini states the “worst case transfer rate occurs when all accesses are made to the same bitstream and that bitstream is located at the inner track of the disk.” Martini continues by stating that a “conventional disk transfers data at four MB/second at the outer tracks and three MB/second at the inner tracks, the worst case transfer rate is three MB/second.” Martini then states “[w]hen allocating the bandwidth, the system assumes that all files are being transferred at the minimum rate and calculates n accordingly.”

Hence, Applicants would assert that here Martini only describes “allocating the bandwidth . . . [based on] the minimum rate” and this rate corresponds to “disk transfers data at . . . the inner tracks,” which is the transfer rate of the physical medium. However, Applicants respectfully assert that Martini does not disclose “an allocation of bandwidth for data copying from the first data storage system to the second data storage system over the network said bandwidth allocation based on an estimate of the data to be copied, a number of invalid tracks between said first and second data storage systems, and a known time period in which to copy said data” as is claimed.

Applicants therefore assert that the cited references, in isolation or in combination, do not teach the claimed invention. Applicants further assert that one skilled in the relevant computer arts would not bridge the gap to arrive at the current invention. Therefore, Applicants respectfully assert that these references, in combination or in isolation, fail to satisfy the 35 USC

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103 test as promulgated by the Supreme Court in KSR. As a result, Applicants assert that this 35 USC 103 rejection is improper and respectfully request it be removed and independent Claims 1, 18, and 28 be placed in condition for allowance. As Claims 2-5, 7, 8, 16, 20-22, and 24-26 depend from Claims 1, 18, and 28, respectively, Applicants assert that they should be allowable for at least the same reasons as the independent claim. Applicants therefore request that the rejection of Claims 2-5, 7, 8, 16, 20-22, and 24-26 also be removed and the dependent claims be placed in condition for allowance.

Rejection under 35 USC 103(a) Colby, Chiou, Martini, Lyon

The Office Action rejected Claims 17 and 27 as being unpatentable over Colby (USP no. 6,449,647), hereinafter Colby, in view of Chiou (USP no. 6,792, 507), hereinafter Chiou, in further view of Martini (USP no. 5,737,533), hereinafter Martini, in futher view of Lyon et al. (6028841), hereinafter Lyon. Applicants respectfully assert that the cited references, together or in isolation, may not be used as a proper 35 USC 103 rejection as they do not satisfy the KSR test as promulgated by the Supreme Court. Therefore, Applicants respectfully request that this rejection be withdrawn and these claims be placed in condition for allowance.

In *Teleflex v. KSR*, the Supreme Court stated that a proper 35 USC 103 rejection requires the following steps be performed: (1) Determining the scope and content of the prior art; (2) Ascertaining the differences between the claimed invention and the prior art; and (3) Resolving the level of ordinary skill in the pertinent art. *Teleflex Inc. v. KSR Int'l Co.* 127 S.Ct. 1727, 1741, 82 USPQ.2d 1385, 1396 (2007). This three part test has also been reemphasized and promulgated in the Federal Register. *Federal Register*, Vol. 72, No. 195.

With respect to Colby, Chiou, and Martini and the first and second prongs of KSR, Applicants would respectfully incorporate the aforementioned arguments as to why these

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references may not serve as the basis for a proper 35 USC 103 rejection of Claims 1-5, 7, 8, 16, 18, 20-22, 24-26 and 28. Specifically, Applicants assert none of these references disclose “an allocation of bandwidth for data copying from the first data storage system to the second data storage system over the network said bandwidth allocation based on an estimate of the data to be copied, *a number of invalid tracks between said first and second data storage systems*, and a known time period in which to copy said data” as is claimed.

Applicants now address the first prong of KSR with respect to Lyon. Lyon states he discloses a “distributed throttle for controlling the allocation of shared bus bandwidth to a number of data transmitting sources. Each source has a local throttle which monitors the amount of traffic on the bus, and generates a local maximum bandwidth allocation which is then self – imposed on the data transmitted by the source.” Abstract. Lyon states his invention “increases the usable bandwidth in a shared bus architecture by eliminating the need to worst-case engineer traffic sources, and by allowing for grade of service based statistical engineering. This invention will provide minimum guarantees of performance for service while supporting statistical engineering.” Lyon further states that the “result of this scheme is that even though packets are bursted onto the bus at high speed, the device is prevented from sending another packet until such time that the average bandwidth due to the previous packet equals the bandwidth limit the throttle block is trying to enforce.”

With respect to the second prong of KSR and Lyon, the differences between Lyon and the claimed invention, Applicants would respectfully assert that Lyon discloses neither an “allocation of bandwidth for data copying from the first data storage system to the second data storage system over the network said bandwidth allocation based on an estimate of the data to be copied, *a number of invalid tracks between said first and second data storage systems*, and a

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known time period in which to copy said data” nor “wherein the replication policy defines replication groups includes devices distributed between the first and second data storage systems and the data replication process is completed when all devices in the replication groups are synchronized.” Applicants will address these assertions in turn.

First, Lyon states he discloses a “distributed throttle for controlling the allocation of shared bus bandwidth.” In doing so, Lyon states his method “prevented from sending another packet until such time that the average bandwidth due to the previous packet equals the bandwidth limit the throttle block is trying to enforce.” That is, Applicants would respectfully assert that Lyon discloses “throttling bandwidth.” Lyon’s enunciated reasoning for his invention is that this provides “a bus capacity allocation method . . . which prevents the overload on a shared bus in a way that permits statistical multiplexing of bandwidth.” However, Applicants assert that Lyon does not disclose “allocation of bandwidth . . . based on an estimate of the data to be copied, a number of invalid tracks between said first and second data storage systems, and a known time period in which to copy said data.”

Further, Applicants would assert that Lyon does not disclose “the replication policy defines replication groups includes devices distributed between the first and second data storage systems and the data replication process is completed when all devices in the replication groups are synchronized.” Lyon stated he discloses a “distributed throttle for controlling the allocation of shared bus bandwidth.” Applicants find no reference to Lyon stating his method “defines replication groups includes devices distributed between the first and second data storage systems.” Nor do Applicants find any reference to Lyon stating that “the data replication process is completed when all devices in the replication groups are synchronized.” Rather, Applicants only find reference to Lyon discussing devices used for his

“throttling bandwidth.”

Referring to the cited portion of Lyon, Column 6 line 7-15, Applicants find reference to a “transition region of the control function . . . may be eliminated . . . throttles are fully synchronized . . . guarantee that all control functions see identical stimuli.” Applicants respectfully assert that the throttles do not “define[s] replication groups [which] include[s] devices” as claimed or defined in the application. With respect to the “replication groups” and devices, it appears the Office Actions asserts that “throttles” are analogous thereto and Applicants respectfully disagree and refer to Page 21 line 20-Page 22 line 19 of the current disclosure.

Specifically, a “Replication Group 440 is a grouping of the Logical Device Groups 442 involved in a replication operation from the beginning to the end of the replication path.” “A Logical Device Group 442 (hereafter simply "Device Group;" Fig. 10) is a grouping of logical devices, such as device group 443 including devices 445 for replication.” “For example a Device Group can consist of a STD device and a BCV device. Other Device Groups might consist of a STD device and a BCV/R1 device, a BCV/R1 device and an R2 device, or a STD device and two BCV devices.” As well as Page 12 lines 4-5 where it is stated “data storage devices that may be logically configured as a standard device (STD) 224 and a mirror of the STD denoted as BCV device 226.” Based on the claims, read in light of the specification, Applicants would respectfully assert that “throttles” are not analogous to “replication groups” or devices therein. Based on this Applicants again respectfully assert that Lyon does not disclose “wherein the replication policy defines replication groups includes devices distributed between the first and second data storage systems and the data replication process is completed when all devices in the replication groups are synchronized.”

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Applicants therefore assert that the cited references, in isolation or in combination, do not teach the claimed invention. Applicants further assert that one skilled in the relevant computer arts would not bridge the gap to arrive at the current invention. Therefore, Applicants respectfully assert that these references, in combination or in isolation, fail to satisfy the 35 USC 103 test as promulgated by the Supreme Court in KSR. As a result, Applicants assert that this 35 USC 103 rejection is improper and respectfully request it be removed and Claims 17 and 27 be placed in condition for allowance.

Conclusion

In view of the foregoing, the Applicants believe that the application is in condition for allowance and respectfully request favorable reconsideration.

In the event the Examiner deems personal contact desirable in the disposition of this case, the Examiner is invited to call the undersigned attorney at (508) 293-7450.

Please charge all fees occasioned by this submission to Deposit Account No. 05-0889.

Respectfully submitted,

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/Joseph D'Angelo/
Joseph D'Angelo (Reg. No. 56,800)
Attorney for Applicants
EMC Corporation
Office of General Counsel
176 South Street
Hopkinton, MA 01748
Telephone: (508) 293-7450
Facsimile: (508) 293-7189